Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • RESTRICTED JUNE, 1950

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THE CHOICE IS YOURS

THERE are airmen in the Air Force today who persist in compromising flying safety. It must not be done. Every instance of such compromise places safety in the realm of chance. The Air Force can not operate by chance. It must follow a definite, precise course based on intelligent and thorough planning. This must begin on the flight line with mechanics, crew chiefs, gunners, pilots. It must carry through every level of operations and administration to the very top.

Since World War I, commanders, air crewmen and ground crewmen have been subjected to an intense program of flying safety education. Every means has been exploited to make airmen conscious of their responsibilities in the safe operation of aircraft.

A great deal of progress has been made and the results are gratifying. But the progress has not been fast enough. Results must be far more extensive. We cannot be satisfied with anything less than the complete elimination of avoidable accidents.

Avoidable accidents are readily traceable to carelessness, ignorance, indifference, lack of professional skill, poor judgment and a myriad of other undesirable attributes, not one of which is excusable in an airman charged with expensive government aircraft and priceless human lives.

Why will a man take off into potentially hazardous conditions of weather and terrain without exploring every threat to his safety? Would the same man undertake a safari through a jungle rife with poisonous snakes, insects and wild animals, improperly equipped for his safety? Certainly not! Why do we have to urge, coerce and plead with a supposedly intelligent man to conserve his life and property?

Why—the question is asked again and again—did he do it so foolishly, when, with an ever-so-slight correction, he would have been alive today? "Ten more feet and he would have made it" is small consolation for the wreckage of airplane and crew strewn about a mountainside.

The answers to these, and all other questions arising out of avoidable accidents, are deep within each individual airman. His intelligence, knowledge, stability of character and judgment determines those answers as well as his fitness for flying confidently and safely.

Flying safety is an individual matter. Whether he's a flight clerk on a transport, a gunner on a bomber, a mechanic on a fighter or a pilot on a trainer, it's the man—the airman—who holds the key to flying safety.

He came into the Air Force with more than just adequate basic intelligence. He has been given the opportunity to gain a thorough knowledge of his job. He has been given a position of tremendous responsibility which requires ambition, judgment, loyalty and cooperation. The time and facilities are made available to him for constantly improving these vital capabilities.

He is expected to know his aircraft and his procedures, to be skillful and efficient. He must learn to think, analyze and act judiciously. It is essential that he fill the gaps in his knowledge and training *by self education and self discipline.*

The airman unwilling to adjust himself to these requirements is a hazard to safe flying. He is a poor investment. Of more direct concern, he is obsolete. He will not last. Life and property can not be consigned to the irresponsible and the incompetent.

On the other hand, the Air Force offers him a long and productive career. The choice is his. It is yours.

Of this truth the airman may be certain: Safe flying is not a product of chance. It will be achieved only by thorough, intelligent preparation and studied, precise execution.

There can be no compromise with safety!

GEORGE E. STRATEMEYER
Lieutenant General, U. S. Air Force
Commanding, Far East Air Forces

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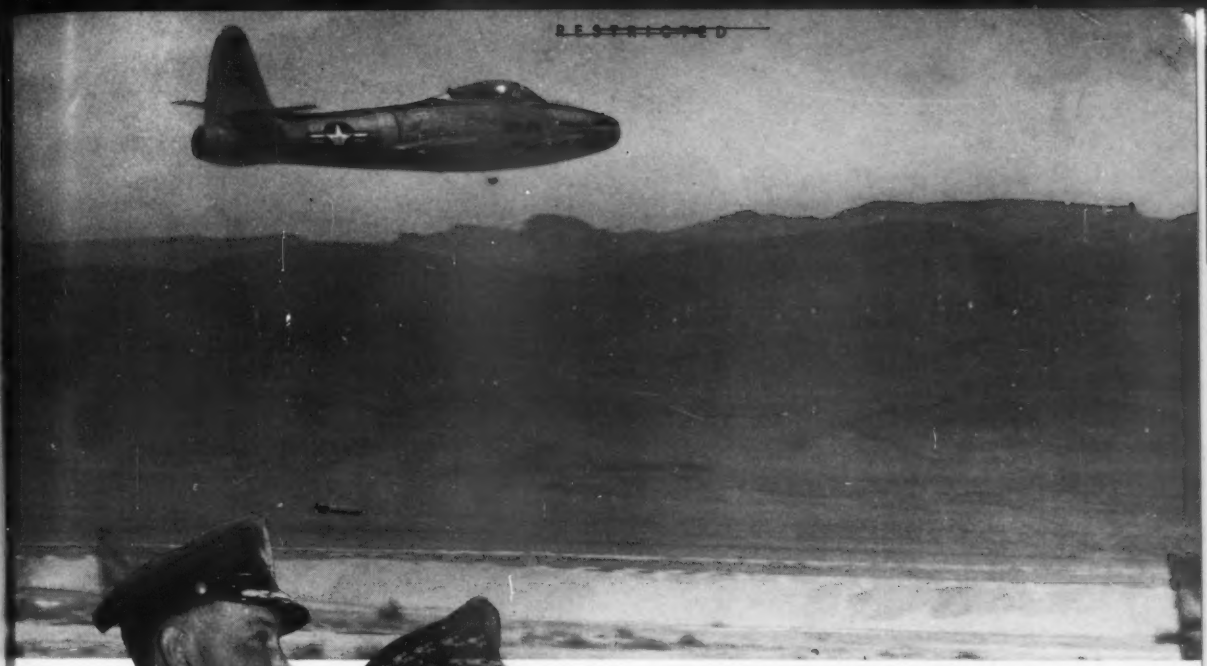


General Vandenberg, right, watches meet with Col. Joe L. Mason

SAFETY SCORES

By MAJOR ROBERT W. YUNDT

Year	Sorties	Accidents	Fatalities
1949	540	8	2
1950	1376	0	0

WHEN the final curtain was rung down on the 1950 USAF gunnery meet at Las Vegas, Nevada, on April 6, there was established a safety mark which may be equalled in future years, but will never be bettered. The above box score tells the story more graphically than could reams of scholarly descriptive writing.

Almost three times as many sorties in 1950 than in 1949 without a single fatality or accident! Twice as many aircraft involved this time! Doubled pilot and ground crew strength!

Based upon 1949 figures, with an accident rate four times higher than the overall Air Force rate for that year, it would seem reasonable that the number of accidents would also increase.

That this reasoning did not prove true is due entirely to the strong emphasis placed on flying

"The successful conclusion of the 1950 gunnery meet without an accident or fatality established an unprecedented record in Flying Safety.

"I wish to commend the large number of participants from overseas and continental commands, who, by their skill and discipline established this record. I wish also to commend all others concerned with the meet and with the United States Air Force Flying Safety Program.

"It is obvious that the preplanning by the Air Training Command and the briefing on accident prevention given by Command and Flight Safety Research representatives to all competitive teams contributed greatly to the safety and the success of the meet. The meet itself was both a test of the proficiency of Air Force pilots and a proof of the soundness of the Flying Safety Program.

"It was a pleasure to witness this outstanding achievement."

Hoyt S. Vandenberg
Chief of Staff, United States Air Force

No accidents, from loading to landing, was slogan of crews.

Loading and charging of guns were closely supervised.

Guns were charged on runway to avoid damage if fired in error.

safety. Here are the indispensable major factors which brought about this amazing achievement:

Complete planning for the meet,

Safety consciousness,

Thorough briefing of pilots,

Pilot and ground crew cooperation.

The 1950 meet was built on a foundation laid at the critiques which followed its disastrous predecessor. In 1949 there were no foul lines, a factor which contributed largely to the high accident rate.

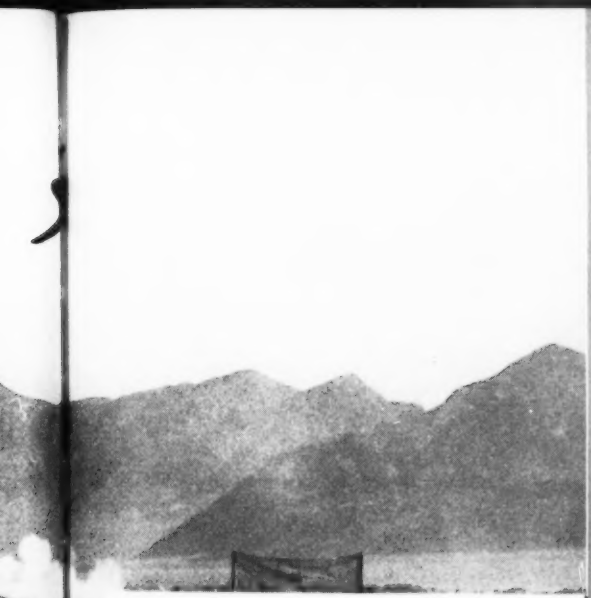
This time there were established an 800-foot foul line for panel ground gunnery, a minimum release altitude of 2,000 feet for dive bombing, a 600-foot foul line for low altitude bombing and a 2,000 foot slant-range foul line for rocketry.

That the pilots gave enthusiastic compliance to every rule is evidenced by the fact that in making the 1376 sorties, they flew 1320 hours of competitive gunnery without an accident.

Every activity was tightly controlled. Loading and charging of guns were rigidly supervised. During the entire meet only two rounds "cooked off." Planning contemplated even such an event, and, because all planes had been nosed out from the ramp in herringbone pattern, no damage resulted.

Another evidence of complete planning was the survey made by local Flying Safety officers of several dry lakes well within gliding range.

Fortunately, these dry lakes were never used.



In addition to the 1376 sorties flown in official competition, 1,020 practice sorties totalling 963 hours were flown by the various teams at Las Vegas prior to the gunnery meet—all without an accident.

Nevertheless, all pilots knew their locations which were projected on a screen at the briefings. Major C. G. Carter, Base Flying Safety Officer, landed a C-47 wheels-down on one of them the morning before the meet began to test the surface for weight-supporting characteristics.

Two helicopters, one para-rescue team and one land-rescue team from Hamilton AFB were available at all times during the meet. These units, with all needed equipment, stood by at the Indian Springs gunnery range for trouble, which never came.

Evidence of the preparations taken for safety was everywhere at the base, which is commanded by Col. Joe L. Mason. There were posters, prepared by 1st Lt. Robert R. Syester, exhorting all pilots to produce low accident rates along with high scores. Others placed stress on the foul lines and the rules governing the entire meet. Pilot briefing left not even the smallest detail slighted.

Gen. Hoyt S. Vandenberg, Chief of Staff, and many other high ranking officers spent considerable time at the meet. General Vandenberg even flew a mission—in a T-33.

Because the meet was intensively covered by the press, radio, television and newsreels, the USAF received wide and invaluable publicity. And all of these, besides telling the story of accurate gunnery, also gave the general public more than inkling as to what the USAF is doing to make flying more safe!

Airplane parking utilized space, prevented ramp accidents.

For winning hits, boresighting was accomplished carefully.

Experts check angle-off, above, count hits in target, below.

Trophies were presented to winning teams at Las Vegas. Back row: Capt. Francis Bailey, Lt. Col. M. L. Martin, Col. Joe L. Mason, Maj. Gen. William E. Kepner, Commanding General Air Proving Ground; Maj. Gen. Robert W. Burns, Deputy Chief of Staff, Air Training Command; Col. Cy Wilson, Capt. John B. Westwood. Front row: 1st Lt. J. W. Roberts, Capt. Robert Knapp, 1st Lt. Charles E. McWhirk, Capt. Jack H. McCreery. Colonel Martin commands the 3525th Aircraft Gunnery Squadron, jet class winner, and Colonel Wilson commands the 27th Fighter Escort Group, conventional class winner.

WINNING TEAMS: JET CLASS

1. 3525th Aircraft Gunnery Squadron, Las Vegas Air Force Base
   Capt. Francis L. Bailey
   Capt. Robert H. Knapp
   1st Lt. John W. Roberts
2. 33rd Fighter Interceptor Group, Otis Air Force Base
   1st Lt. Marcell E. Webb
   1st Lt. Jack C. Schwab
   1st Lt. Ralph S. Parr, Jr.
3. 81st Fighter Interceptor Group, Kirtland Air Force Base
   Maj. Arlie J. Blood
   Capt. Archie Ashcraft, Jr.
   1st Lt. John B. Fink

CONVENTIONAL CLASS

1. 27th Fighter Escort Group, Bergstrom Air Force Base
   Capt. Jack H. McCreery
   1st Lt. Charles E. McWhirk
   Capt. John B. Westwood
2. 8th Fighter Group, Itazuke Air Force Base
   1st Lt. Herman F. Son
   Capt. Asa A. Adair
   1st Lt. Donald S. Sirman
3. 86th Fighter Bomber Group, Neubiberg, Germany
   Capt. Alfred C. Hearne
   1st Lt. Dave S. Shackelford, Jr.
   Capt. Franklin C. Crain

WINNING GROUP COMMANDERS, JET CLASS

1. Lt. Col. Staton T. Smith
   49th Fighter Bomber Group
   Misawa Air Force Base
2. Lt. Col. Maurice L. Martin
   3525th Aircraft Gunnery Squadron
   Las Vegas Air Force Base
3. Col. William A. Daniel
   36th Fighter Bomber Group
   Furstenfeldbruck, Germany

CONVENTIONAL CLASS

1. Col. William H. Councill,
   86th Fighter Bomber Group
   Neubiberg, Germany
2. Col. Oliver G. Cellini
   52nd Fighter All Weather Group
   McGuire Air Force Base
3. Col. Cy Wilson
   27th Fighter Escort Group
   Bergstrom Air Force Base

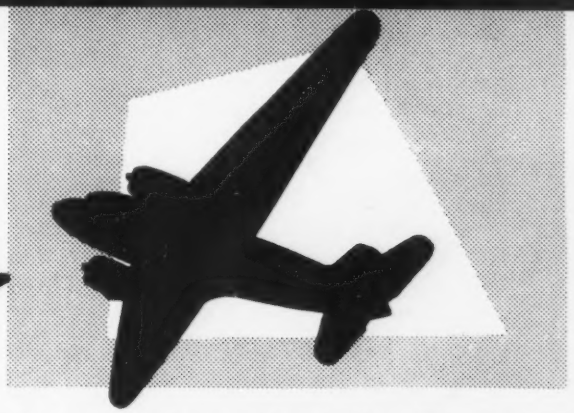
SHOW STOPPER

The loudspeakers boomed an announcement to the crowds, "A Flying Disc is about to be demonstrated."

The saucer, when it flew by the stands, was a Piper Cub, trailing a tow target of red flannel underwear. It dropped two 100-lb. practice bombs (suitably lightened to 25 lbs. each).

Then Capt. Richard V. "Rex" Riley, Las Vegas Training Aids Officer, who was aboard the "Flying Disc," fired Very pistol flares at the targets.

ANCIENT *and* ABLE



By COL. EDWARD G. KIEHLE
Chief, Maintenance Technical Section
Air Materiel Command

NEXT time you fly the hoary old C-47 or preflight the venerable T-6, don't consider them as future flying accidents. Instead, you might even compare them favorably with grandma's fruitcake as improving with age.

Why? Because rigid tests of old and new aircraft structures have disproved the bewhiskered belief of some pilots and maintenance crews that in-flight structural failures are caused by structural weakness resulting from long service.

Results of these extensive tests by the Air Materiel Command have indicated that no loss of strength occurs in aircraft structures during normal service. In fact, just the opposite. It was generally found that an increase in strength of from one to two per cent may be expected, due to work hardening.

The fact that every year a number of aircraft break apart during flight is no indication that such accidents are caused by "metal fatigue" or "old" parts.

Most of these accidents are attributed to some excessive maneuver. Still, in some instances, there is good reason to believe that failure in flight did not result from a maneuver. In such cases, the conclusion or belief is reached that failure was caused by structural weakness resulting from long service.

A typical example might be reported as follows:

"The aircraft completed three passes at 350 mph indicated airspeed from 1500 feet altitude without incident. On the fourth pass the left wing broke off and the aircraft snap-rolled twice and then struck the ground, disintegrating completely upon impact. Failure occurred just after the pull-up was started.

"The pilot was experienced and well above average in ability. He had over 400 hours in this type of aircraft, 20 hours the previous month, and had flown similar missions without incident. The pilot was briefed to fly well within all limitations and apparently had flown the mission as briefed.

"The accident was witnessed by the target crew, several maintenance personnel and by other pilots. All of these witnesses are unanimous in their opinion that the last pass at the target was started from the same altitude, followed much the same path, and was not made at higher speed than the previous passes.

"A check of the history of the aircraft revealed that before being transferred to this activity, the aircraft had been employed for 1600 hours for training. At the time of the crash, the total time on the aircraft was 1809:30 hours.

"It is believed that the wing structure was weakened during previous service by frequent and repeated stresses up to or above the published limit. This activity has three additional aircraft having 1500 or more hours of training service and it is recommended that one of these be tested to establish safety operating limits for such aircraft."

The idea that aircraft may be weakened by operation above published limits, by hard landings, or by other abuse is not groundless. When evidence of damage is detected, it is almost certain that the structure has been weakened. Defects such as wrinkled or buckled skin, deformed primary structure, cracked skin or structure, and tipped, pulled, loosened or sheared rivets all indicate that the structure has been overstressed and probably weakened.

An F-47 and an F-51, both of which had been dived and pulled up to near limit load 5000 to 7000 times in wartime training service, were tested and found as strong as new-production aircraft of the same types. It has been established by these and other tests that as long as no defects can be found by careful inspection, it is safe to continue to operate aircraft indefinitely, no matter how old they are or what usage they have seen.

By LT. COL. GERALD F. BEANE

NEXT to Phyllis, his wife, and their two-year-old twins, Gloria and Carole, Maj. Eddie Anderson lived for little else save flying. But for months he had barely met his flight minimums. He brooded over this—inwardly cursed the A-2 who had picked him for Wing Executive and was sullen and often irritable with his associates.

To Phyllis and the twins, however, he gave no indication of his remorse. He saw Phyllis only as lovelier than when he first met and fell in love with

her at the Senior Prom. And the twins—well, they were going to be even more beautiful than their mother.

"I'm the luckiest guy in the world," he often told himself. "It's good to be home with my family." He wondered though why the afterthought always persisted: "Gee, if I could only get a regular flying job. Then I'd own heaven!"

In his sleep, he dreamed he was at the controls. Invariably, there was Jack Hudson in the right seat. Great guy, Johnny, the fightingest pilot he'd ever known. And then there was Tech Sergeant Lundy as Crew Chief. Lucky to have Lundy. Gosh, he knew as much about an airplane as Joe DiMaggio knows about baseball.

Memories released in dreams . . . Cross country flights . . . that time they got lost in the snowstorm en route to Great Falls, Montana . . . the first overwater hop from Adak in the Aleutians to Tokyo . . . innumerable 12-hour flights from island to island in the Pacific . . .!

Sometimes he would awaken suddenly with his head feeling as if he had been flying for hours at 15,000 feet without oxygen. There were days, too, when his hands shook and when he was not at all sharp on the mental trigger. He had made some bad slips recently which could embarrass his chief. One of these days, he assured himself, there would be a change and he would find himself behind the eight ball. The Old Man might even get him grounded. The thought struck terror in his heart!

The summons came, much sooner than he expected. The boss had casually said to him after Monday morning staff meeting, "Andy, come in when you get a chance. I'd like to talk with you about your efficiency report."

The Old Man's friendly "Come in, Andy," was heartening, but even so he had misgivings. He wondered why he knocked at the door. He had done that only once before—when he first reported to the boss.

"We'll be together a lot, Anderson, so let's forget the formalities," the boss had said at that time.

Andy remembered that occasion. He had come to idolize his chief. Why the jitters now? His efficiency report? Yeah, those boners he'd been pulling lately. That's what he'd hear about—good-bye to his superior rating! And some stern advice from the boss! That would be even harder to take!

Col. Don White—"Butch" they called him when he played guard on the Army team many years ago—was a soldier's soldier. Although nearing retirement age, he still looked and acted like a man in his early forties. An oldtimer, he'd flown everything from Jennies to jets. His job now, Commanding Officer of the 61st Depot Wing, was to service and repair jets—to keep 'em flying.

"Have a chair, Andy," was the kindly greeting as the colonel pushed aside a report he had been reading.

Andy braced himself. He knew the Old Man was only tempering the blow that was surely to follow.

"I've just completed your efficiency report," the colonel went on. Andy gulped. Here goes everything, he thought.

"First of all, Andy, I want you to know how much I appreciate all the help you've been to me," the colonel went on. Andy could hardly believe his ears. This must be a dream.

"I've given you a high superior, boy. You're going places in the service if you keep on doing only half of what you've done for me."

"Andy's reply was a decidedly weak "Thank you, sir. You are too generous. I know I don't deserve this and - - - "

"You've been eating your heart out, lad, all these months. I've known all the time how much you wanted to fly. I've been through all that myself, you know. But I guess I spent lots of precious government time griping. And coasting, too."

"About a year ago," the colonel resumed, "I made a decision. I think it was one of the best I've ever made. And it concerned you. I feel I should tell you about it now."

Andy started to interpose, he had been trying to frame words to express how grateful he was, but colonel still insisted on doing the talking.

"About a month after your babies were born, Phyllis came to see me. She asked and I promised to give you a job that would allow you to be home with her. She told me she was terrified at the thought of being left alone, even for a single night. She cried a lot and, I imagine, I was moved by her tears. Otherwise, I might have refused her. An officer, you know, must be placed in a job where he'll be of most benefit to the service."

Andy again endeavored to get in, "That was very wonderful of you, sir," but the colonel had not finished. He got up and walked about the office. For some seconds he was silent. Finally, he said:

"Andy, we're starting a daily freight run between here and McClellan. You'll be in charge. And you should be home every night. Want it?"

"Want it, sir! Gee, I'll never be able to repay you! You're the greatest officer in the Air Force. You're the . . ."

The colonel walked with Andy to the door, gave him an encouraging pat on the shoulder. "By the

way," he said as a parting shot, "Mrs. White wants Phyllis and you to join us at dinner Thursday night. See you then."

The colonel went back to his desk, picked up the report he had been reading. But he only glanced at it. His thoughts were about Anderson. Clever officer, that boy . . . training as executive had helped him . . .. Would come in handy for him some day . . . Might become a high level staff officer, even general officer . . . Wonder should I have told him I let him go because Phyllis came here only two days ago to see if I wouldn't get him grounded? Selfish girl . . . Thinks only of herself . . . Doesn't realize that wives can make or break officers . . . Mental hazards caused by marital discord . . . Tough on ground officers . . . suicidal for pilots.

• For days Andy's joy knew no bounds. Phyllis even seemed enthusiastic when he told her. "We're doing the town, tonight, Baby, and tomorrow I want you to chase down and buy yourself a whole flock of clothes. And presents for the kids, too. We've got to celebrate!" She came to him and he held her close. Phyllis' worry that Colonel White had told him of her most recent visit to him left her.

Phyllis never looked more radiant, Andy thought, than the night of the dinner at the White home. He enjoyed the visit thoroughly and later remarked to Phyllis that Mrs. White was the cleverest woman he'd ever known. "Next to you, Darling, of course," he added.

But Phyllis did not share his happiness. Why did Jean White have to recite her experiences as an officer's wife? All those years it took for her husband to rise from a second lieutenant to major—25 in all. No flying pay or any sort of bonus in those times. It took scrimping and saving every penny to get enough to put Audrey through Vassar. And Audrey had repaid them only two weeks after graduation by running off and marrying a Naval lieutenant. She had so much wanted for Audrey all the things the service had denied her. Never any reserve in the bank, but always plenty of bills. Hot and sticky posts in the Philippines, Panama, Texas, New Mexico; bleak ones in Alaska and the far west. Seldom a real home. Innumerable separations. She would do it all over again if given her choice.

"Always a great trooper, Honey," Colonel White had said, casting a look of deep affection at his wife.

Phyllis felt in her heart that Jean White had put on this as an act for her special benefit and her resentment was deepseated. No man was worth such a sacrifice. Wives like Jean White were simply fools. Anyway, hadn't she done her share in heading Base drives for charity and club activities? Jean White did only the bossing.

• Weeks passed without incident. The freight run was scheduled four days each week and Andy was home every night. There were picnic trips to the mountains and seashore almost every week. They had seldom done this in the old days. Life was exceedingly full for the Anderson family.

But storms were soon to break over their marital horizon. Phyllis made no complaint the first time he had to RON at Sacramento because of bad weather, but she was plainly vexed the second time, a week to the day later, when he phoned to tell her he couldn't make it. There was no "Bye, honey," from her which was customary in their phone talks. He wasn't even sure she hadn't hung up on him. Since then she had assumed a particularly cool attitude.

The climax came a couple of weeks later, the result of the first long flight he had made since taking over his new job. He had flown some special parts to Maxwell, where he had spent his cadet days. At nearby Montgomery lived Trudy Conlon, a mighty attractive young school teacher. He might have married her if he hadn't met Phyllis. Even though they'd never met, Phyllis frequently quizzed him about her and, on one occasion, had snapped, "I'll never like her!"

Always when he landed, Phyllis and the youngsters were at the line to meet him. "When is Andy's ETA?" was one of the most frequently propounded questions answered by the folks in Operations. This time, however, no Phyllis was there to greet him.

He saw them 15 minutes later after a mad rush home in a rented cab. Phyllis was seated behind the wheel of their car with the twins beside her. In the rear seat was a mass of luggage, baby buggies, dolls and toys.

Andy scarcely had time to say, "Howdy guys," his usual greeting, when Phyllis screamed at him.

"Don't make a single excuse, Edward Anderson. I know everything now. How's your adorable Trudy Conlon in Montgomery? And that other trick in Sacramento?" Phyllis' voice rose to a shriek. "You can have all of your nights out from now on!"

"But, Honey," Andy pleaded, you're so wrong about it all—please, please let me explain." The twins, who rarely cried, began to bawl.

"Don't 'Honey' me, you brute. I never should have married you. You're nothing but a cheap throttle jockey, you're—"

"And you're a woman who'd ruin any decent husband." God, what was he saying? They'd never had the slightest rift in their four years of married life. But he kept on. "Go get yourself a divorce —

the sooner the better. You're a hell-cat!"

But most of what he said went unheard as Phyllis threw the car into gear and drove off.

• Dazed, he staggered inside the house and threw himself on the divan. His head reeled, tears coursed down his cheeks. At last he saw things clearly. Phyllis would drive the 60 miles to her mother's home. He'd phone her there. He'd get himself grounded or get out of the Air Force. Phyllis was right. A married man with two kids should be home all the time. It wouldn't be easy to quit flying but he'd do it. Yeah, he'd put in a call in an hour. To go on without her and those twins—well—he'd get things righted! Thoroughly exhausted, he fell fast asleep.

The ringing of the phone aroused him. He jumped up eagerly, glanced at his watch. This was Phyllis, surely. She had time to get to her mother's. She'd say she was sorry, he knew, ask his forgiveness. She'd tell him she'd be back in the morning. Andy's hand trembled with excitement as he lifted the receiver.

"This is Colonel Day, Andy," Day was Base Security Officer. "Got a hot trip to Weston with some highly classified stuff. Has to be there tonight. I've contacted Hudson and Lundy and they're ready. You can make it there in two hours and be back tonight. Can you start in 30 minutes?"

"Be right down, sir." He hoped his voice didn't betray his disappointment." Will you send me a jeep, sir? I'm without my car. Phyllis has it."

Within five minutes after reaching the line they were in the air. "Wanta make it in a hurry and come right back, Jack," he told Hudson, with a forced smile. Better if nobody knew about his heartache.

The trip to Weston was routine except that Hudson noticed Andy had pushed the C-47 more than customarily. He was a bit puzzled, too, why Andy seemed so quiet. No conversation, so Hudson busied himself with turning the radio compass.

Andy never made a more perfect landing than at Weston. A top-secret control officer awaited them there, Andy turned over two huge boxes containing classified documents, and obtained a receipt. Then he ran to Operations to get his clearance.

"Weather back home not so good, Jack," he informed Hudson, when they were airborne, "but they said it should clear in an hour."

• An hour out and over Newton, he was told that his home base was fast closing in. He hesitated a second before replying, "Okay, I'll go in on GCA." He just had to get back and call Phyllis. A little weather wouldn't stop him.

GCA brought him into the pattern perfectly.

Good thing, this GCA, he thought. Bring a guy through anything. Why, if it wasn't for the GCA outfit he would have been delayed in landing and calling Phyllis. Wonderful girl. He was crazy.

His thoughts were interrupted by a voice in his earphones, "8118, this is your final controller."

"You need not answer further. If for any five-second interval you do not hear me . . ."

From then on it was the voice taking over. Accuracy . . . Confidence . . . Andy was only half listening to the voice of the controller as he thought about Phyllis. He wondered what she was doing at this minute. Wouldn't be long now, he thought, and he could make that telephone call.

The descent had started on instructions.

"You are slipping slightly below your glide path," the Voice warned. "Suggest you level off. You are now 50 feet below the glide path, decrease rate of descent. You are 75 feet below the glide path. You are 100 feet low. Pull up and go around! Pull up and go around!" Now the Voice was shouting!

As the controller's voice shouted the final warnings, Andy's reaction was too slow as he snapped out of his reverie about Phyllis and became aware of Hudson's hand reaching to advance the throttles. But the hand was too late. The C-47 struck a tree top and went spinning into the ground.

• It was three days after the crash and Andy was to have his first visitor. The doctor had told him that he was not seriously hurt, just a collar bone fracture and shock. Hudson and Lundy had been even more fortunate — should be up in a few days.

Phyllis rushed to his bedside, smothered him with kisses. "My own precious," she sobbed. "You might have been killed."

"There, there, sweetheart," he consoled. "You weren't the slightest bit to blame. It's enough that you're here now when I need you."

For a time they remained in blissful silence. Then she told him about herself. She hadn't driven to her mother's, got no farther than the White home. The Old Man was away on a flight and Jean White took her in, put the youngsters to bed.

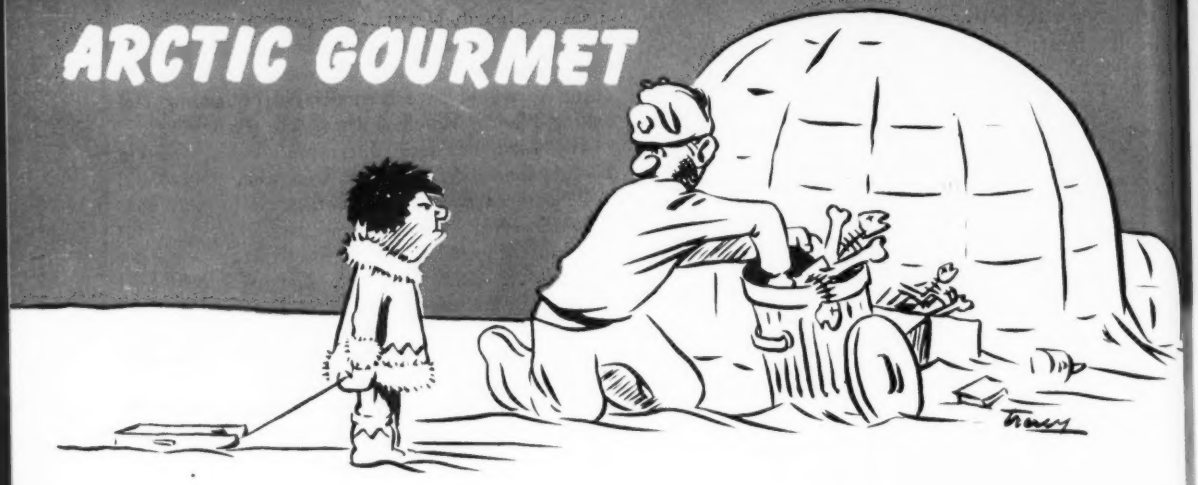
"I was completely out of my head, Dear, and Jean was darling. After I'd calmed down she tried to reach you, but failed. Then she contacted Operations and was told you'd gone on a special mission. She didn't tell me about the crash until later."

A nurse looked into the room. "You're 15 minutes overtime, Mrs. Anderson. You must leave now."

"Yes, thank you, nurse." She got up to go, but returned for an instant to the bedside.

"Just one thing more before I leave, honey," she said. "I am your copilot—in everything."

ARCTIC GOURMET



By R. V. DODDS
Director of Public Relations, R.C.A.F.
Illustrations by Flight Sergeant Ray Tracy
Courtesy "The ROUNDEL,"
Official Publication, R.C.A.F.

WHAT is perhaps the world's most unusual cookbook has recently been prepared by the R.C.A.F.'s School of Survival at Fort Nelson, B. C., which has trained more than 200 aircrews in the techniques of beating the northland. Primarily responsible for its contents are two R.C.A.F. officers with years of experience in the Far North—Flight Lieutenant S. E. Alexander and Flying Officer R. J. Goodey. Both are former Mounties.

Nothing in the manual is theoretical; it is all based on actual experience. Neither of the officers mentioned may be any great shakes when it comes to whipping up a chocolate cake, but when it is a matter of finding food in the Far North, they are probably among Canada's best providers and cooks. Arctic authorities say that a knowledge of cookery alone could have saved many lives in the Arctic during the last 100 years. It was—to quote only one case in point—mainly lack of knowledge of northern food sources that brought about the destruction of the Franklin Expedition nearly 100 years ago.

The Arctic gourmet is not too concerned with the tickling of fastidious palates. His main purpose is to tell you how to cater for the inner man if you are forced down in the Far North. Few housewives are likely to become enthusiastic about serving a dish of lousewort for their husband's suppers—in fact, even an advertising genius would have a tough time making housewives lousewort-conscious. Nevertheless, as the manual points out, the "woolly lousewort, found in the tundra and growing five to eight inches tall, with pink or purple flowers, is the most tasty food plant in the north, the root being the edible portion." That piece of information alone might someday save a flier's life.

The following quotation gives an idea of the simplicity of the recipes:

"All animals in the north are safe to eat—bats, lizards, newts, frogs, and even snakes, which taste like the white meat of chicken. Grubs found in the ground or in rotten wood make good food. So do grasshoppers, toasted on a stick. Pick off legs and wings before cooking. Do not eat caterpillars; some are poisonous. Meat is meat when you are hungry."

The Arctic meat menu ranges from mice to polar bears and walrus, but in the case of larger game, there is an added problem of how to avoid becoming a meal for the animal.

The book covers about 30 edible forms of plant life found in the Arctic and Sub-Arctic, giving a description of the plant as well as recommended ways of cooking. More than 50 different animals, birds and fish are also dealt with, and many hints are given on how to catch your northern dinner before you prepare it. Poisonous plants are described in detail, as well as those animals and items of seafood which are (or may be in certain seasons) dangerous to eat.

The following are among the foods you should know:

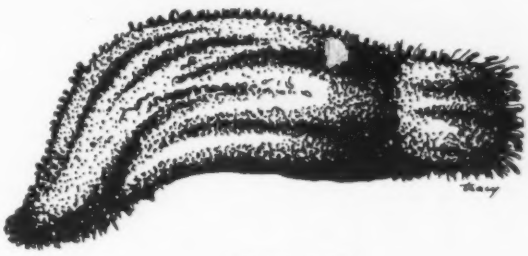
Seaweeds—Seaweeds should be on your menu whenever possible. Sea lettuce is a pale lettuce-green and has the appearance of a piece of crumpled tissue paper. Another species is purple. Both varieties are black and shiny when dry, and they can be used in the same way. It should be thoroughly washed and may be eaten raw, boiled with a little water to make a thick soup, or used as a thickening for soups and stews of meat or fish. When cool, it forms a jelly.

Dulse can be gathered along the shore between tide marks. It is a large red seaweed, shaped somewhat like a hand, with a palm and long fingerlike fronds. It should be washed, boiled and used to thicken soups or dried and eaten raw.

Carrageen moss clings to stones and rocks under water. It has flat forked stems about two to twelve inches long, of a greenish purple-brown or reddish brown color. Wash and dry in the sun. It can be used to thicken soup or steeped in boiling water to make a jelly.

Lichens—Lichens are low plants of various shape and color. Found throughout northern Canada and the Arctic, they are all edible. They grow either on rocks or in the soil, and are best collected after rain. Reindeer moss, which is very plentiful, grows in colonies on sandy soil, is greyish in color and profusely branched. It can sometimes be gathered from under the snow.

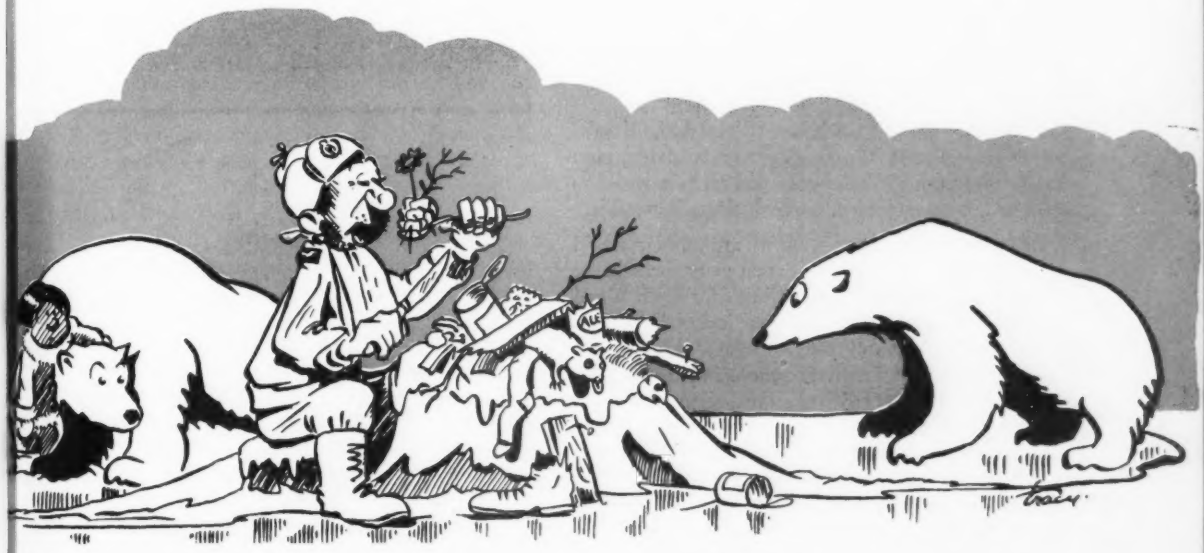
None of the lichens occurring in the north are poisonous, but most varieties contain an acid that is bitter and sometimes nauseous and may cause severe internal irritation if not first extracted by boiling or soaking in water. When the lichen is cooked, dry it until brittle, then powder by rubbing between the palm of the hands or by pounding with a stone. If the powdered lichen is soaked overnight it can be boiled to a jelly-like consistency and added to soup or stew.

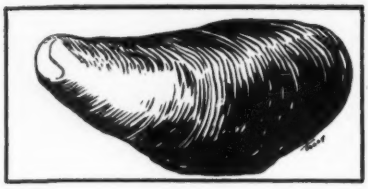


SEA CUCUMBER

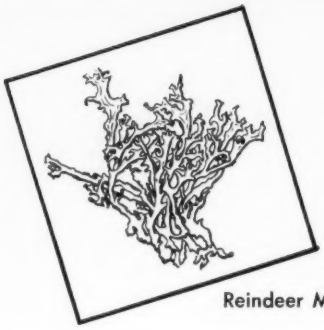
Dandelion—The dandelion, which is a pest in the South, is a potential lifesaver in the Polar regions. Both leaves and roots may be eaten raw, and the leaves make fine greens if cooked like spinach.

Sea Cucumbers—These queer looking animals have the shape of cucumbers. Throw away the insides and scrape away the slimy outer skin. Cut them up and cook in a stew or else fry.

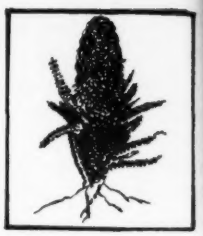




Mussel



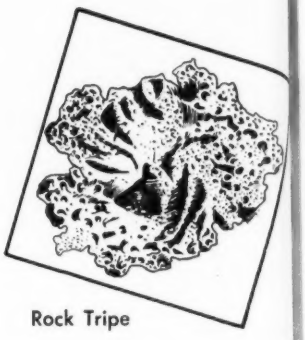
Reindeer Moss



Wooly Lousewort

Dandelion

Lemming



Rock Tripe

Lemming—Lemming are stub-tailed mice that range throughout the Arctic. In winter they nest on or near the ground, deep in snow drifts, and you have to dig for them. In summer, you can find them by overturning flat rocks. You can get them also by hitting them as they scuttle along their runways or by setting snares of very fine wire along the runways. Lemming are preyed upon, not only by hungry aircrews, but also by shrews, weasels, foxes and owls.

Fish—All northern fish are edible, and all salt-water fish—except the shark—may be eaten raw. Fresh-water fish in the North may contain parasites that will make you sick, so cook them if possible.

Mussels—Most polar mussels are edible. Avoid any that don't shut up tight when you touch them; they are either sick or dead and unfit for food. Avoid also the black mussel, about two inches long, that is attached to rocks by tough threads. This mussel sometimes becomes deadly poisonous in summer time and cooking does not destroy the poison.

The North, despite all rumor to the contrary, is not and never was a land of plenty insofar as wild forms of food are concerned. Food is often hidden, and must be sought out. The man who has the "know-how," however, can survive.

It's OK to eat snow. You can usually melt enough snow for drinking at meal times to last the body most of the day. Eating too much snow will chill the body and thus waste calories. But if you cannot stop traveling, or haven't the facilities to melt snow, eat it in small bits, or lick it from the hand, like sugar or salt, after you have breathed on it to warm it a bit. Do not swallow until the snow or ice is completely melted.—USAF AIR RESCUE SERVICE—

Sales job

RADIO comedian Fred Allen once said that a salesman is anybody who can sell anything to Jack Benny and still make a profit.

Which reminds one that Benny's mythical sales resistance is no greater than that of convincing Mr. and Mrs. United States, realistically, that the USAF is giving value received for every penny of the billions being poured into Air Defense annually. That is the sales job of every USAF pilot!

Yes, sir, your service pilot in this streamlined age is a salesman every minute of his waking hours. That he is making good on the job is shown not only by the acclaim of the general public, but also by his standing with his austere Uncle Sam. Otherwise it would not have been possible for this country to produce the best aircraft the world has ever seen. Thus far, Uncle has been appreciative and mighty generous.

Unlike his earth-bound salesman brother, who travels on an average of 20,000 miles annually, our USAF salesman of the sky logs a minimum of 300,000 miles a year. At this juncture it is important to emphasize that both are engaged in missions which serve our country.

The former sells everything from radios and television sets to intricate turbines, electronic marvels and other devices, products which make our living standards the envy of the world. The pilot sells the public on the importance of Air Power and its ever-increasing contribution to national defense—insurance that all of these advances in science will be utilized to maintain our peace, security and happiness.

The similarity between these counterparts ends when it comes to transportation and responsibility. Here the civilian gets all the "breaks."

If the snow is piled high outside and the mercury drops to 15 below, our civilian can still stay inside his warm hotel room and warble, "Baby, It's Cold Outside!" Meanwhile the chances are that the airborne salesman is at that very time making a "must" experimental flight which will later not only save valuable government property but also precious human life.

When a B-36 is wrecked, the loss to the people of the United States for the aircraft alone is estimated at more than $2,500,000! For every hour that type bomber is flown, the cost is placed at more than $1,000, enough to allow the terra firma lad to operate his old gas buggy for a year or more. This $1,000 figure, of course, does not include the pay of the pilots and crew.

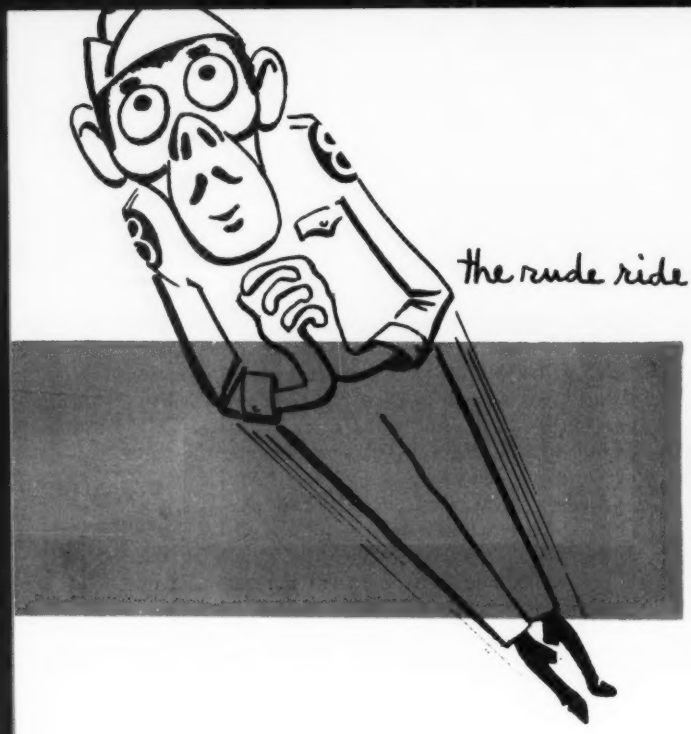
And the B-36 cost is not the only one in seven figures. Look at the price tag for the C-121, passenger and cargo plane familiarly known as the "Connie." Should Utah want to purchase one of these supercraft, it would mean nicking every man, woman and child in that State for a little more than $2.00 each, in taxes. The price? More than $1,150,000.

There are cheaper planes, to be sure. Take the C-82, the Flying Boxcar, which can transport a platoon of infantry or disgorge heavy guns and even tanks from its roomy fuselage. You could get one of these if you could ante about a half million dollars in cash.

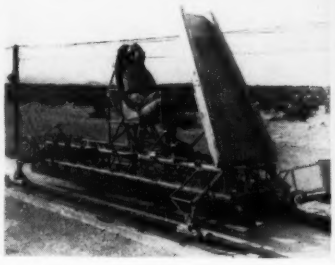
And those trim little fighters range in price from some $50,000 plus for the F-51 to more than $250,000 for the F-86.

The purpose of citing these figures is to show, in part, the staggering amount of money invested in Air Defense and also the tremendous responsibility placed on the men who fly the planes. Obviously, these salesmen of the blue must possess the same kind of "know-how," the specialized training and love of the job which spell success for their grounded cousins, those top-flight sales engineers who sell capital goods and structures, the machines which produce more capital and make America great.

Our future Air Power is threatened by accidents. Pilots flying military aircraft, be they Regulars, National Guard or Reserve, have the additional very important sales mission of preaching and practicing Flying Safety. A continuing sales drive by all three components, in what General Stratemeyer terms "proficiency and enthusiasm in the cockpit," will achieve this end. It will assure that we will be ready for any emergency and guarantee present and future backing of the USAF by the country.



the rude ride of Oscar 8-Ball



By

MAJ. JOHN P. STAPP, USAFR (MC)

Edwards AFB, Muroc, Calif.

OSCAR Eight-Ball weighs 185 pounds. He looks like a man, although he is made of canvas and steel and he spends most of his time just sitting on the floor of a warehouse, staring into space with his large, frightened eyes. His face is of rubber and was bought in a dime store. His eyes are a pair of burned-out camera flash bulbs, realistically painted, even to little veins on the whites. They bulge at least one-half inch beyond his cheeks, giving him a permanent expression of horrified surprise.

Oscar recently had the most memorable experience of his ordinarily dull existence. Clad in an old suit of summer khakis, with a black and white Eight-Ball shoulder patch jauntily tacked to his shoulder and a fatigue cap neatly nailed to his brow, he was tied in a sitting position, facing forward, on a low-slung rocket sled known as the "Hot-Rod Number 1." Instead of the usual steel and aluminum windshield, a new one made of one-inch-thick pine planks sloped in front of him.

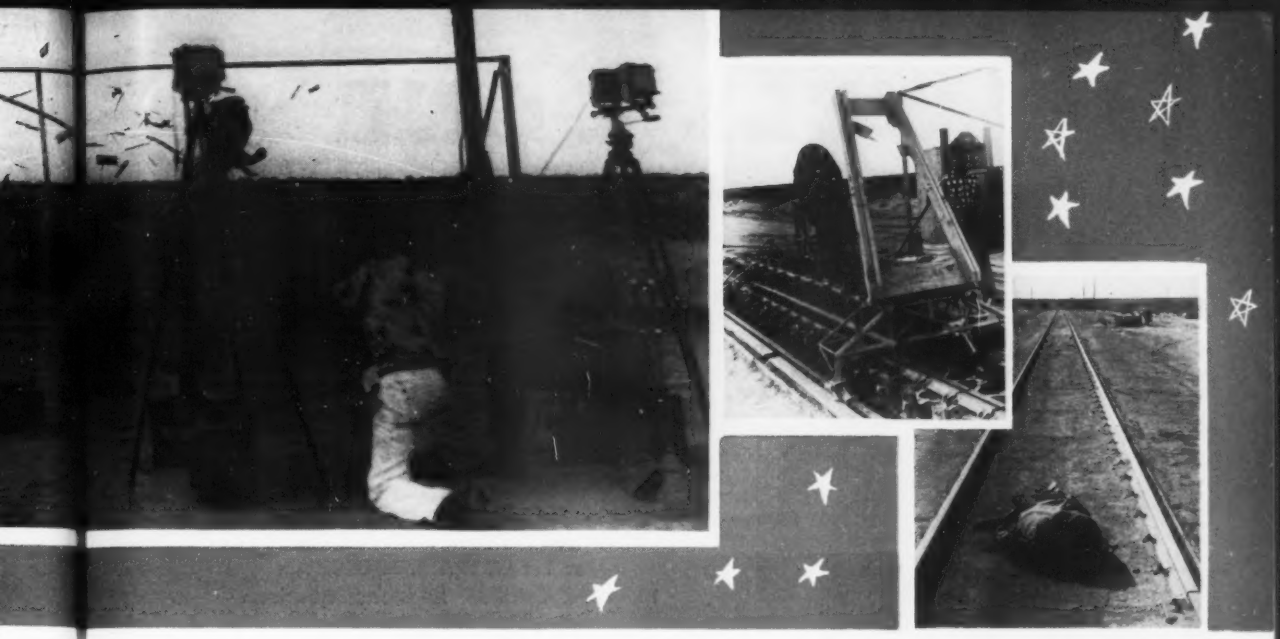
When two very weak looking straps were tied around Oscar to fasten him to the chair, his flash bulb eyes came out another quarter of an inch from anxiety. "What, no shoulder straps?" he wondered dumbly. When the mechanics and the photographers started measuring with tapes from his tip-tilted nose to the wooden windshield, he knew something drastic was coming. He was speechless. He could not move, but that was not unusual. Presently, everyone went away and there he was—all alone in a rocket sled on 2000 feet of railroad track, with nothing between him and the open desert beyond the rails except forty-five sets of brakes capable of six million pounds of pressure. The sun was shining. The soft "gentle" winds of Muroc were blowing. From the control tower a voice called out over the loud speaker system:

"Firing time one minute. Firing, one minute." Then all was quiet, until the voice again—

"Firing, four five. Firing, four five." The strain was getting unbearable. All of poor Oscar's nails and bolts began to quiver in anticipation. Then—

"Firing, three zero. Firing, three zero." Poor Oscar could not even close his eyes.

"Firing, one five. Firing, one five," the voice called inexorably. He could not breathe. Like the tolling of doom, the voice counted off:



"10-9-8-7-6-5-4-3-2-1—Fire!"

Instantly there came a tremendous hissing noise, like a locomotive blowing off steam just behind him. Great steel hands seemed to press against his back and hurl him faster than falling from a ten-story building. The wind whistled through the cracks in the wooden windshield, until, just as he reached 177 miles an hour, the hissing of the three one-thousand-pound thrust rockets stopped. Before Oscar could heave a sigh, it happened. The sled hit the brakes. Oscar surged forward, unable to resist Newton's second law. The two frail straps broke just as the sled was caught in the million-pound grip of a half dozen brakes. Oscar hit the wooden windshield in a most undignified manner, with all of his 185 lbs. moving at more than 150 miles an hour. The one-inch-thick pine boards burst like tissue paper before his mighty onslaught.

Oscar completely lost face, but he scarcely lost momentum. By tremendous leaps and bounds, he broad-jumped forty feet at a stride down the concrete roadbed between the tracks. He finally stubbed his toe and came to a halt, 710 feet from where he had left the sled—a spent and broken thing. Gentle hands placed a steel cable around his middle. He was yanked from the roadbed and dumped sprawling in the dirt, a few feet from the track.

"We just made it; it's quitting time!" voices above him said. They climbed into their cars and left. Oscar was alone with not even a blanket to cover his poor iron bones. Darkness came on. Back at the laboratory buildings, the sergeant on guard left the project for a couple of hours and forgot to tell the guard where he was going. The guard, on his rounds, missed the sergeant and became alarmed. He sent in a report. Reinforcements came to help him search for the missing sergeant. Presently a young guard, wandering in the darkness, came upon Oscar, sprawled in the sand.

Panic-stricken, the young guard ran back to the others, shouting, "I found the sergeant and he's dead! He's lying in the sand by the tracks!"

Jumping into a jeep, they drove down the road until their headlights revealed nobody but poor, old Oscar Eight-Ball, lying alone in the sand, little knowing that he was just another dead hero, never realizing that his ride would be photographed for you to see.

Have you been an "Oscar Eight-Ball" lately, or do you use your harness when you fly?

WELL DONE

CALM efficiency under adverse conditions prevents aircraft accidents. But lack of familiarization with emergency procedures and lack of enthusiasm for maintaining proficiency end in crashes and deaths.

The manner in which the men here have coped with difficult situations reflects the high degree of professional pride each has assumed in the practice of his chosen career. The incidents emphasize that USAF officers and airmen are taught to think and act on their own initiative.

Flying Safety Magazine welcomes the opportunity to publish such stories whenever superior airmanship, piloting or maintenance saves an airplane or crew from disaster.

Commanders and Flying Safety Officers are invited to submit accounts of such outstanding feats of airmanship. The knowledge gained by others when they read how one accident was prevented may be of great assistance in preventing tragedies under similar situations.

To: 1st Lt. IRA S. SPENCER
1115th Special Air Missions Squadron
Dobbins AFB, Georgia

There was a 200-foot ceiling and one-mile visibility when Lieutenant Spencer took off from Blackstone, Va., for Lawson AF Base, Georgia. At 6700 feet indicated altitude, the right engine of the C-47 missed and cut out. Throttled back, it would run but deliver little power. It was not possible, because of weather, to return to Blackstone, and it was doubtful that the plane could maintain altitude with its heavy load.

Blackstone Radio was advised that it was impossible to continue to climb to the assigned altitude, 10,000 feet. Clearance was obtained from ARTC to cruise at 6000 feet and later to let down at Danville Airport, using the non-directional radio beacon. Danville was reporting 500 feet and two miles visibility. The 20 passengers had been calmly briefed by the engineer, M/Sgt. Harold M. Peacock, and assisted into their parachutes.

The cylinder head temperature on the right engine dropped to zero, while the oil temperature rose to 150°C; the engine was feathered to reduce fire hazard and to trim the plane for single engine flight before the letdown was begun.

Danville Radio gave Spencer a heading across the station so that a return heading, letting down, would line up with the runway. Descent was stopped by the use of 39" hg and 2350 rpm at about 300 feet above the terrain. Approaching the field in scud and rain, he sighted the runway just in time to lower gear and flaps for a successful landing.

To: 1st Lt. RICHARD C. KIRKLAND
Flight "C", 4th Rescue Squadron
ARS-MATS, McChord AFB, Washington

Lieutenant Kirkland was flying an H-5 along the isolated, rocky coastal area of British Columbia at 30 feet altitude as he searched the beach for signs of survivors of a crashed bomber. Suddenly, the tail rotor shaft sheared, leaving the 'copter without directional control. He landed it undamaged in two feet of water.

An escorting RCAF Norseman, on floats, landed nearby and a quick estimate of the situation indicated that the trouble had just begun. The tide was rising and it was apparent that the helicopter would soon be engulfed. The Norseman pilot radioed his advance base and within an hour and a-half, a Canadian Marine high-speed launch reached the scene, bringing block and tackle, axes and additional personnel. But nothing short of a sky-hook would move the disabled helicopter over the rocks and safely onto the beach. Time was fast running out as the tide crept up the struts of the helicopter.

While launch personnel hacked a clearing out of the forest, Lieutenant Kirkland hit upon a solution. First, he tied a length of rope to the tail boom of the helicopter. Then, after instructing six men to "hang on and keep this eggbeater from spinning," he started the engine and gingerly lifted the helicopter a few feet in the air. It worked. After going a few yards, he set it down while the men caught up with the 'copter. Successive attempts soon had the helicopter high, dry and safe. Lieutenant Kirkland's superior flying skill and initiative saved the USAF an expensive Helicopter.

To: S/Sgt. HAROLD D. TALLEY
Perrin AFB, Texas

When visibility dropped to almost zero during a severe duststorm, 1st Lt. H. B. Frankier was forced off his course. Knowing that he had a limited fuel supply in his T-6, he contacted nearby Perrin AFB for assistance.

Frankier was told by the tower that the radio range was inoperative because of mechanical difficulties, but that an attempt would be made to bring him to the field with the VHF directional finder.

The airdrome officer at Perrin, 1st Lt. K. R. Ellis, called for a DF operator but discovered that none was available, the DF being in operation only during student flying.

S/Sgt Harold D. Talley, a control tower operator who had studied DF operations during his off-duty hours, volunteered his services, although he had had only two hours' actual experience in working the intricate instruments. Two others, Sgt. Robert S. Earle and Cpl. Milton J. Sirotiak, assisted Sergeant Talley in his attempt to bring the plane down safely.

Because of mechanical trouble in the radio system of the finder, Talley was forced to use a telephone to relay bearings to Frankier through the tower. Cpl. Robert Cook, tower operator on duty during the emergency, transmitted the bearings to the aircraft. After receiving three bearings from Talley, Frankier managed to sight the field and make a landing. Only 12 gallons of fuel remained in his plane.

To: 1st Lt. FRANK J. KNAPP
Mather AFB, California

After takeoff in a B-25, the gear-up signal was given by 2nd Lt. Herbert Leong, a pilot being checked by Lieutenant Knapp. The main gear came to about three-fourths up position, but the nose gear stayed down. The gear handle was put in the down position and the main gear came down and locked, but the nose gear light indicated unsafe to land. The horn, hydraulic pressure, selsyn indicator and lights were checked, and Lieutenant Knapp went through the lowering and raising sequence several times, but to no avail. When the gear lock was checked visually through the inspection hole in the crawlway, it was found to be unlocked. The emergency system was tried, but failed to lock the nose gear. A check of the Pilots Operating Handbook assured him that all emergency procedures had been used.

A side brace from the jump seat was tried as a tool, but this failed to produce sufficient pressure to force the lock into place. Then a fire ax, obtained from the rear compartment, was tried by Lieutenant Knapp, who used the hooked end. It did the trick. Returning to the cockpit, he found the desired readings on all gear indicators.

As an added precaution, a tail low landing was made, dragging the tail skid a considerable distance. At touchdown, the mixture controls and mag switches were cut. The nosewheel was held off until the plane neared the end of its landing roll.

To: Aviation Cadet WILLIAM L. TALBOT, JR.
Williams AFB, Arizona

Cadet Talbot was not only the first student in Class 50A to solo the F-80, but he was also first to make a power-off descent, approach and landing.

While practicing routine stalls at 35,000 feet, the plane suffered a partial loss of power and the cadet tried to nurse the flame back into all the combustion chambers by easing on a little throttle. After two such attempts to regain full flame, Cadet Talbot was down to 33,000 feet and 80 miles from his home base. Knowing that if he allowed partial flame to continue while he lowered his altitude he would accumulate raw fuel in the bottom of the engine, he decided to shut the engine off entirely and glide to a lower altitude and attempt an airstart. By calculating his ground speed and rate of descent and distance to the home base, he figured he could glide to his home base and still have sufficient altitude for a safe landing. At 11,000 feet he built up engine rpm and completed a normal airstart procedure. No fire! Again he drained the tailpipe of excessive fuel and re-established his 190 mph glide, and upon reaching 8000 feet, tried another airstart. When this failed, he concentrated on his letdown and landing pattern.

Since he was still maintaining the low gliding speed of 190 mph, he allowed himself an extra 1000 feet for the pattern. He passed over the end of the runway, made a 360-degree overhead approach with a normal pattern and accomplished a good landing.

Cadet Talbot had only 15 hours and 30 minutes in this type aircraft.

MOUNTAINS climb

A SURE way to alienate the affection of Air Rescue Service and crash rescue crews and to go down in their books of people-with-whom-we-hate-to-do-business, is to fly up a valley from which you can't climb out or turn around. It's hard for ARS to find you and crash rescue crews are not notoriously fond of the typically rugged terrain associated with narrow steep valleys far from roads and equipment.

The accident pictures of two C-47's on these pages show the inevitable results of having too much air above you and not enough beneath and around you. In one case the crew was fortunate—

they all survived though seriously injured. The other crew was killed in the crash.

The first C-47 was on a low-level photographic mission. Upon the completion of the first run, the pilot turned into an extremely narrow valley whose floor rose 3500 feet within a distance of five miles, necessitating a maximum performance climb. There was insufficient space to make a 180° turn. At a dangerously low airspeed and at an altitude so low small trees were brushed, the plane was banked steeply to lift a wing over hummocks on either side. During the course of one turn between hills, the right wing struck a tree, causing the plane to swerve. The pilot banked the plane sharply to the left but mushed into the side of the valley where the plane exploded and burned.

In the second case, during the course of a search mission the plane was flown into a canyon at an altitude below that of the canyon walls. Shortly after entry, a severe downdraft was encountered. High power settings were applied and the nose raised in an effort to maintain altitude. Airspeed fell off to such an extent that a turn was impossible and the plane stalled out and mushed into the canyon wall at an estimated airspeed of 65 mph.

The six men aboard set up camp near the wreck and the more seriously injured were given first aid. The pilot struggled out through five miles of deep snow to a road where he soon obtained assistance. A crash rescue crew working all night brought the rest of the crew to safety and hospital care.

In avoiding accidents of this nature, veteran mountain fliers advise against flying in any canyon. But, if a canyon or narrow valley must be entered during the course of a mission, you should first survey it from a safe altitude, determining width, turns, obstructions and so on. Fly *down* valley with plenty of airspeed. Be extremely careful of downdrafts, eddying air currents and other vagaries of the wind. Never get into a situation where safety depends upon more horsepower than your engines possess.

Once is enough!

ONE DAY when the more cautious fly-boys sat gazing out the window at birds walking, I filed clearance, an IFR from Andrews to Scott. A check on weather indicated that a small amount of ice would be collected—freezing level, 4000. My flight plan at 8,000 would be in solid soup. So, being the type who definitely aspires to longevity, I decided to make positive check on propeller anti-icing equipment before firing up. This was the procedure:

"Sergeant, let's check the prop anti-icers before starting up 'cause we'll likely need 'em today."

"All done, sir," answered the crew chief. "They work okay and the tank is three-quarters full."

I thought: "A crew chief with Tech Sergeant stripes should know whereof he speaks." So I let it go at that.

With a feeling that everything was okay, we took off in the C-47. Thirty minutes later we had taken on that white-sidewall look. The prop anti-icers went on. One thing can be said in favor of ice—your troubles build up gradually.

In light clear ice with engines running rough and airspeed steadily dropping, it didn't take a genius to figure out that the propellers weren't taking the full bite. Running the props through occasionally would help but only temporarily, and after an hour it became definitely apparent that this procedure alone was not enough.

By this time we were beyond the high terrain, had dropped to 4000 with ATC approval, and were just dragging along above stalling speed by using extra power. The trouble definitely pointed to the props as the ice on the leading edge was not enough to require boot operation.

A landing was the only answer and we had no choice but to take what lay underneath. This turned out to be Charleston, West Virginia. Radio Range CHW reported weather was above minimums, but with gusts up to 65 mph.

After a typically acrobatic approach and landing through turbulence, we wheeled up and proceeded to trouble shoot. Off came the cap of the prop anti-icer tank. Suspicions confirmed—no fluid.

So move over, Captain Hoffman (Author of "Take Nothing For Granted," — *Flying Safety*, March 1950). In the future, we'll both "take nothing for granted."

CAPT. R. L. N., USAF

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IT WAS A DARK NIGHT in January 1942 when I almost put a heavily loaded B-17E in Tampa Bay. Both the B-17 and I were fresh out of the factory—the airplane out of Boeing and I out of Barksdale. The bomber had been picked up by my pilot at the plant in Seattle and flown to Langley from where I helped fly it to Tampa. My duties as copilot were to read off airspeed, pull up the gear and turn off the booster pumps.

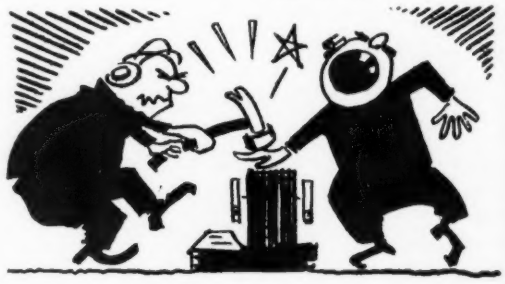
As we cruised down to Tampa, I looked over the cockpit and memorized my takeoff duties. What a life! What an assignment for a 2nd lieutenant fresh out of flying school! I had all the faith in the world in my pilot—*he* was a 1st Lieutenant!

We landed at MacDill, picked up the remainder of our crew, and loaded much equipment. A few days later we were ready to go. It was 0300 when engine runup was accomplished and the pilot applied power for takeoff.

The Fortress labored down the runway and at the extreme end staggered into the air. I quit dreaming and remembered what I was to do—bring up the gear. I did. Then, just as quickly I reached forward to help adjust the throttles. Then, forward again to turn off the four booster pumps. Suddenly, in the darkened cockpit, I felt a resounding "whack" across my knuckles and the pilot shouted, "Don't *ever* do that!" I peeked at the switches and dials in front of me; the bluish glow of the fluorescent lights made me realize that I had started to pull back all four fuel shut-off switches! These four switches were located just forward of the four booster pump switches and were of the same toggle type.

Now, eight years later, I still remember that incident as I turn off booster pumps. I'm in no hurry anymore. I wait until sufficient altitude has been attained before I turn them off, one at a time—at the same time watching the fuel pressure gages for any indication of trouble.

CAPT. P. W. E., USAF



flight in RAIN

It appeared to the pilot, who was squinting through the rain-covered windshield of his plane, that he would clear the hilltop that loomed ahead. He didn't. Rain on the aircraft windshield had caused him to misjudge the terrain height, a fatal mistake brought about by a hazard to flight that the pilot didn't know existed—refractive vision error.

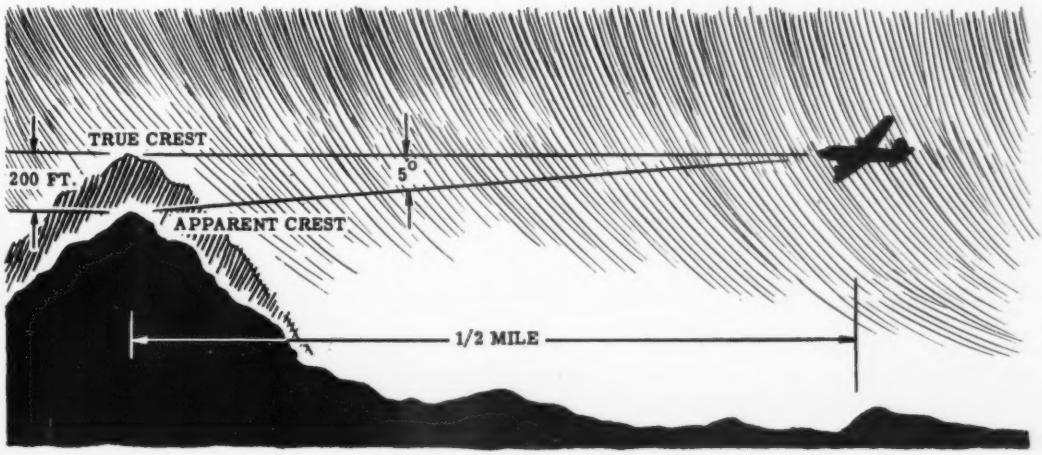
This error has recently been emphasized to Canadian fliers by the National Research Council of Canada. The Council found that the error created by rain on the aircraft windshield has two primary causes: First, the reduced transparency of the rain-covered windshield causes the eye to see a false horizon; and second, the shape and pattern of the rain ripples formed on the windshield, particularly in sloping types, cause objects to appear lower.

The error may be present as a result of one or a combination of causes, in which case it is accumulative, and amounts to a probable maximum error of five degrees in angle, or about one in 12. This amount of error, of course, is dependent on the amount of rain, speed of the airplane and shape of the windshield. With a maximum error of five degrees in angle, a hilltop or peak one-half mile ahead of a plane could appear to be 200 feet lower than its actual height.

This illusion can be created by the eye response to the relative difference of bright contrast and dark contrast. Visibility may be effectively improved by increasing contrast—that is, keeping windshields scrupulously clean. In addition to drops of water, particles of dust and grease on the windshield will scatter light haphazardly into deviated or displaced light rays to multiply the refractive error.

Whenever light rays are displaced by refraction, the amount of displacement depends on the design and thickness of the glass. Since the aircraft glass surface is seldom perfectly plane parallel, light passing through is deviated as by a prism or wedge. The degree of this prism effect in windshields can increase with the addition of a thin coating of rain flowing or rippling over the glass surface. When the glass is dirty or scratched, this is even more pronounced.

Pilots should bear in mind this additional hazard which exists when flying in conditions of low visibility in rain, and should maintain sufficient altitude and take other precautions as necessary to allow for the presence of the refractive vision error—even over known terrain.



RUNWAY ILLUSIONS

HOUDINI didn't have a monopoly on the perfect illusion business. In making landing approaches under poor visibility conditions, pilots can mistake for the real thing a runway illusion created by other lights.

And, as borne out by several recent aircraft landing accidents, the cause of the runway illusion can and does happen frequently.

In one instance the pilot of a T-6, making a night flight over a waterfront area, reported to a nearby air station that his fuel supply was low and requested permission to land. After receiving landing clearance the pilot began a letdown and the T-6 broke clear of a thin overcast at 2000 feet. Sighting what appeared to be the runway he set up a tight pattern and landed his plane . . . on a waterfront pier!

Up to the point of turning on the landing lights, this pilot thought the lighted pier was the runway. The landing might even have been completed successfully had the plane not struck crated freight piled high on the pier. The T-6 cartwheeled down the dock and was completely demolished. The pilot luckily escaped with minor injuries. Within 2000 feet of the pier was the fully lighted runway of the air station.

Under slightly different circumstances, a routine training flight in a C-47 ended disastrously because of the "runway illusion."

On a night instrument approach with a 700-foot ceiling and a mile-and-a-half visibility, a C-47 descended through the "soup" and the pilot accomplished a normal procedure turn on the range leg. As the plane broke into the clear around 1000 feet the field was in sight and the pilot, cleared for landing, lined the plane up with what he took to be a well-lit runway. Deciding against using landing lights because of existing haze conditions, the pilot eased the throttles back and the C-47, in a tail-low attitude with full flaps lowered, settled to a touchdown with hardly a jar.

This landing might also have been "one for the books," except that after some 800 feet of the landing roll was completed the pilot suddenly saw automobile traffic criss-crossing just ahead of his still rolling plane. Desperately, in one coordinated reflex move, the pilot gave full throttle to the slowing C-47 and attempted to pull the plane off the ground.

Barely becoming airborne in a stalled attitude, the C-47 mushed over a boulevard highway, ploughed through telephone and high-tension wires, rammed through two fences and bellied to a flaming stop within 100 feet of an airfield runway. The pilot and crew safely evacuated the burning wreck. In landing, he had mistaken a newly installed slope-line approach light system for the runway.

Two days before this accident, at the same airfield, the pilot of an airliner on a landing approach under similar IFR conditions made the same mistake. In this case an accident was averted through alert tower personnel sending him around.

From the foregoing "runway illusion" accidents, it is apparent that parallel rows of lights marking harbor breakwaters, piers, bridges, etc., near airfields and resembling runways, can, under foggy or hazy conditions, create the "runway illusion". With the installation of the double row slope-line approach light system at several civilian and military airfields, pilots of aircraft on landing approaches and breaking out of low overcasts have little time to determine whether their plane is over the left or right row of lights, and must be aware of the runway characteristics of the approach light system.

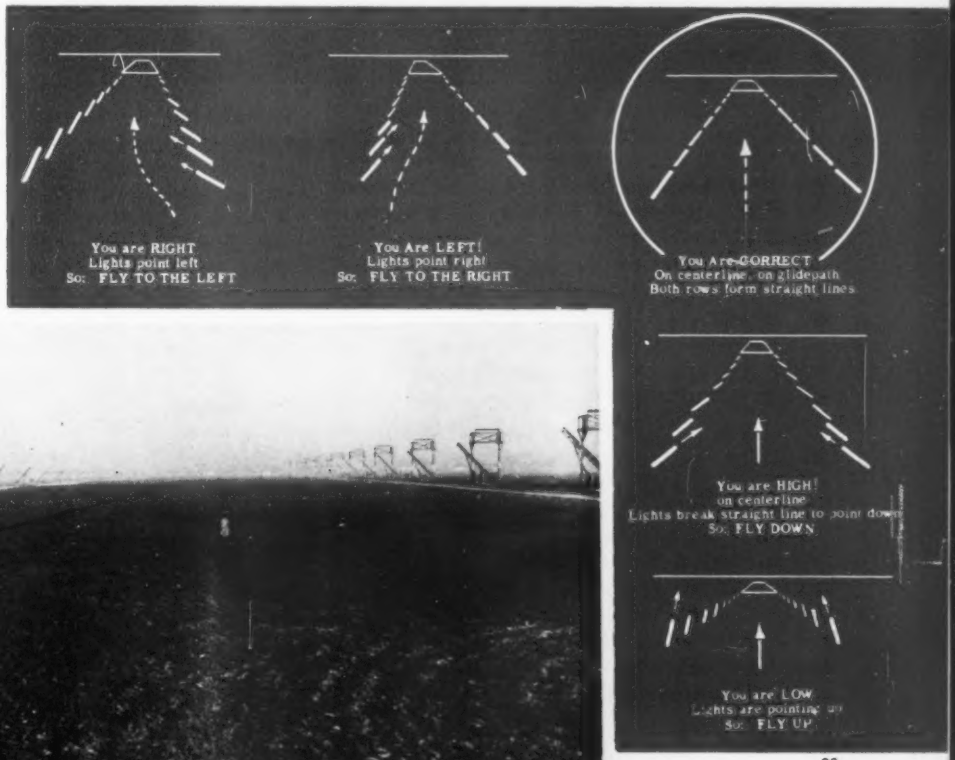
As currently installed, the slope-line approach light system offers a pilot both horizontal and vertical guidance, showing him his position with respect to the ideal path leading from the approach to the runway end. As outlined in AFR 91-19, the slope-line light consists of several fixed lamps arranged in a line on a square-shaped mounting. When lighted and viewed from a distance the appearance is that of a bar of light.

Also, the lights are arranged in a definite geometrical pattern. All of the right hand lights are in one plane, all of the left hand light in another, with the ideal approach path being the line of intersection of these two planes.

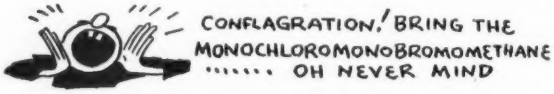
The appearance of the slope-line system when viewed from the ideal approach path is distinctive and readily identifiable by a pilot who has once seen it. Various other definite patterns are presented when the system is viewed from points not on the ideal approach path. The angle of these light patterns indicate corrections to the pilot.

But, until the day mechanical brains can completely take over the airplane from takeoff to landing, pilots on night flights under IFR conditions must remain alert to the dangerous runway characteristics of any parallel rows of lights near airfields, and be positive the runway on which they are landing is the real thing.

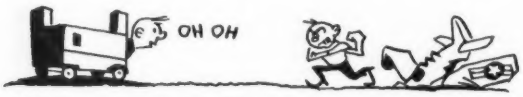
SLOPE LINE INDICATIONS TO THE PILOT



B-36 May Boast New "Boots"—Convair is testing track-type landing gear on the XB-36, prototype model of USAF's heavy bomber. Although track-type gear has been tried on cargo planes and light bombers, the XB-36 installation is the first on the heavy bomber. Two endless belts are installed in place of the four wheels used under each main landing gear strut. The track on the main gear is designed for a maximum average of 57 pounds pressure per square inch on the landing strip as compared to a pressure of 156 pounds per square inch exerted by the wheel-type gear on the B-36 at the same gross weight.

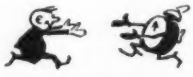


Good Ol' Monochloromonobromomethane — USAF has let a contract for conversion of fire extinguishing equipment on B-29's to handle CB (monochloromonobromomethane) a new fire extinguishing agent. Comparison tests on an experimental B-29 which have been conducted to determine the relative effectiveness of methyl bromide and CB is smothering engine fires under flight conditions are responsible for the change.



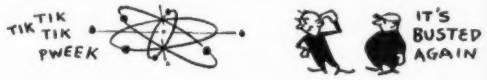
GCA Personnel Memo—While making a GC approach in a heavy snowstorm, a C-54 was pulled up a quarter mile from touchdown because the pilot mistook approach lights for the runway lights. Apparently abandoning GCA instructions, he veered off the correct heading.

Headquarters Airways and Air Communications Service has prepared a memorandum stating that GCA personnel will advise pilots of hazards of this kind.



CAA Adopts 24-hour Clock—The CAA has adopted the 24-hour clock system for all operations. Transcontinental and Western Airlines switched to the 24-hour system with the CAA, but continues to use 12-hour clock system for timetables and passenger contacts. Other airlines are expected to adopt the CAA standards for convenience.

Shooting Stars—The Lockheed F-80, manufactured since 1945, will go out of production this year with delivery of 200 F-80C's. The F-94A and F-94B will replace Shooting Star production.



Atomic Powerplants—Atomic powered aircraft would have no practical range limitation, being capable of circling the world several times non-stop. The atomic power plant would use uranium as fuel, and a turbine engine or some equivalent for converting the heat generated by the atomic reactor into thrust. Simple diagrams showing the manner in which such an engine could be adopted for use with turbo-prop, turbo-jet and ram-jet engines were presented to the fifth annual flight propulsion meeting of the Institute of the Aeronautical Sciences.

Jet Engine Life—USAF has disclosed repeated in-flight starting and stopping of auxiliary jet engines considerably reduce the time between overhaul of the engines, particularly such as those installed on the B-36. It has been reported that the J-47-11 engine used in the B-47 has a rated overhaul life of 100 hours, but the identical engine on a B-36 is good for only 40 hours. The difference is due to rapid cooling of the engines, once stopped, at high altitude requiring new warm-up periods.

◆ ◆ ◆

Unit Transfers—In a move to strengthen a defense net across the Pacific Northwest approaches, the 81st Fighter Interceptor Wing, minus one Squadron, has been shifted from Kirtland AFB, New Mexico, to Moses Lake AFB, Washington. Group headquarters and two squadrons of the 62nd Troop Carrier Group have been scheduled to move from McChord AFB to Kelly AFB, to be re-equipped with Douglas C-124's. The group's third squadron will stay at McChord. To make room for the 62nd group, the 25th Air Depot Wing has been shifted from Kelly AFB, Texas, to Hill AFB, Utah.

Brakes on B-50 Retraction—The application of brakes prior to retracting the landing gear on takeoff of the B-50 and the C-97 has been found unnecessary and undesirable by the Boeing Flight Test Section. Except in cases where a severe airplane vibration is noted or when a main wheel tire is known or suspected to have blown out, the test section cited the following reasons for eliminating the procedure under all normal conditions:

(1) Application of brakes during climbout complicates the pilot's actions.

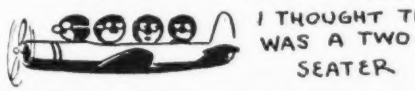
(2) The possibility of brake action during gear retraction, which would result in high stress in landing gear actuating unit.

(3) Brake applications after wheels have left the ground are necessarily hard and could result in jammed or locked brakes. Poor cooling within nacelle causes sticking or locking.

(4) Sufficient clearance exists in wheel wells for wheels to rotate.

(5) Balanced wheel assemblies prevent vibration from continued rotation under most normal conditions.

Fly Ball, Fast Feet; Fireworks, Flaming Seat—A New York newspaper has reported the case of a young baseball player who chased a fly so enthusiastically that friction of his pants ignited matches in his pocket. The player kept after the ball and caught it, despite the fact that the burning matches touched off a pocketful of firecrackers. While this story concerns a match problem during ground flight, the same danger can exist in an airplane flight if matches or other inflammables are packed in luggage.



Beech Trainers Ordered—Beech Aircraft Corporation has been awarded an Air Force contract for three YT-34 all-metal two-place military trainers. The YT-34 is the designation for Beech's Model 45 Mentor, a 225 h.p. trainer.

Oh, Say Can You See?—Capable of withstanding 2500 degree temperatures, a 12-foot periscope has been developed by General Electric which permits engineers to peer directly into a jet exhaust pipe. Jacketed in thick stainless steel, the periscope is cooled by a 45-gallon per minute water cooling system. One end of the new 'scope may be placed as close as 10 feet behind the engine.

Conac Unit To Get F-94's—Lockheed two-seated radar-equipped F-94's will replace the F-82 Twin Mustangs of the Continental Air Command's 325th Fighter Wing. Wing headquarters and two squadrons are at Moses Lake AFB, Washington, and a third squadron at McChord AFB.

CAA "Squawk Sheet"—To obtain greater safety in civil aviation, CAA has inaugurated a new personal aircraft reporting system which provides each owner, pilot and mechanic with an official "squawk sheet" for reporting mechanical difficulties and malfunctions with his airplane. Reports are made on a single sheet, Form 1226, which can be folded, sealed and mailed as a letter. The forms require no postage. The reports are expected to improve safety by providing information toward preventing the recurrence of similar difficulties.

◆ ◆ ◆

Briefly Noted—The second model of the XF-90 jet Air Force penetration fighter has been delivered to Edwards AFB, California. . . . As a possible move to reduce accidents in private flying, CAA has been considering new regulations for the certification of both aircraft and airmen . . . The B-36 modification program, which consists of converting B-36B's to 10-engined B-36D's has been transferred to Convair's San Diego plant.

The Tactical Air Command is scheduled to receive the first two production models of the Douglas C-124A. The new plane will operate both as a cargo and troop carrier for TAC and as a support transport for the Strategic Air Command.

Cross Feed

FLYING SAFETY IDEA EXCHANGE

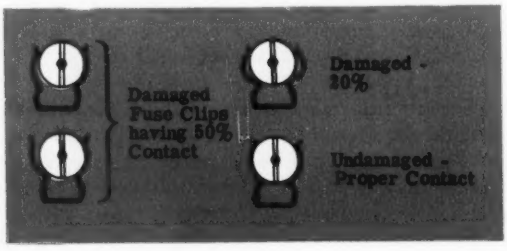
Fuse Troubleshooting

Poor contacts cause blown fuses and replacing a fuse without correcting the cause of the first blow invariably results in another blown fuse. In some instances the cause may be difficult to locate, but one common cause of blown fuses—poor contact—is often overlooked when seeking the reason for circuit failures. Poor contact is indicated if the surfaces gripped by the fuse clips are discolored. If the contact has been tight, little air can get to the fuse caps where they are gripped in the fuse clips and the surfaces of the fuse caps will be bright and clean.

Damaged fuse clips may hold a fuse but they cannot provide the contact area required to insure trouble-free service. For example, where only about 20 per cent contact is made, a 30 ampere fuse would carry little more than six amperes without overheating. In addition to making complete contact on the fuse caps, fuse holders must grip the fuse tightly. If a fuse can be easily rotated in the fuse clips, it does not have sufficient contact pressure. Clips that have lost their spring tension should be replaced. Contact pressure is just as necessary as contact area.

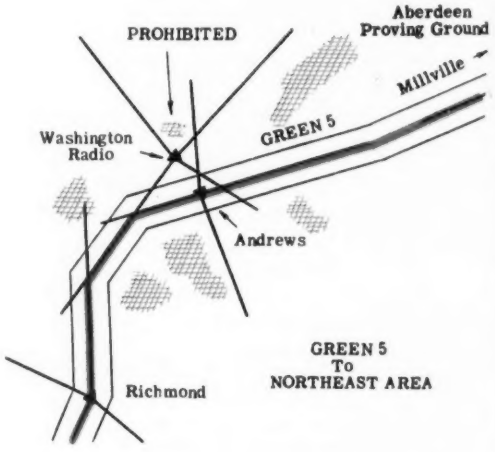
As guides in fuse troubleshooting, this information adds up to some fairly simple rules:

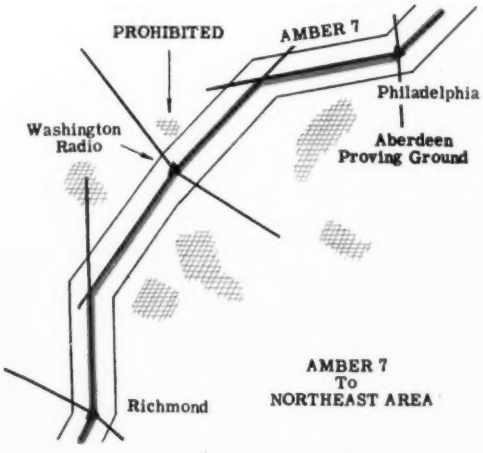
1. Avoid permanently spreading or bending clips when removing or installing fuses.
2. Do not insert a fuse in a live circuit since the resulting arc would cause a burr on the fuse cap and result in poor fuse contact.
3. If the fuse caps and the insides of the clips are not bright and clean, polish them with fine emery cloth.
4. Insure good electrical contacts at or near the fuse in all fused circuits. —Boeing Field Service



Avoiding Danger Areas

Two easy ways to avoid proving ground danger areas and the air space reservation in Washington, D. C., are shown in the accompanying drawings. Prepared by the Flying Safety Office of Air Proving Ground Command, the flight paths simply follow radio range courses which bypass these areas. By tuning in the ranges, pilots have an added check to keep from straying over prohibited ground.





Flight Practice Guide

PILOTS at Kelly AFB, Texas, are helping each other to improve flying proficiency. When reduction in individual flying time was ordered as an economy measure, the need for most efficient use of available aircraft time was obvious.

Maj. E. E. Tyminski, chief of flight operations; Capt. D. E. Egan, instrument training, and Capt. V. J. Andress, of flight control, devised a system which enables pilots to accomplish definite air work on each flight. The chief of flight operations and his assistants fly with base pilots as often as possible. During these flights notes are made of weaknesses. Then, when the pilot returns for a flight on his own, he is handed a proficiency sheet, showing him the items to which he should devote more time. They believe that pilots can check each other if they are given a little encouragement and guidance. When they find that a pilot is above average proficiency on certain procedures, aural null, for example, they assign him to fly with a man who needs more training in use of the radio compass.

The proficency check list, locally mimeographed, includes the following:

A. Hood:
   1. *Range work* — orientation, holding, letdown Missed approach.
   2. *Aural Null* — orientation, distance out, station passage, letdown and approach.
   3. *Instrument practice*—partial panel, change airspeed, climb, descent.

B. GCA and VHF/DF—Flight Technique and Voice Procedure.

C. Aircraft handling proficiency:
   1. *Stalls* — power-on, power-off, various positions of flaps and landing gear.
   2. *Single engine*—crusing, in turn, in pattern and landing simulated.
   3. *Conventional pull up and go around.*
   4. *Short field*—landing, takeoff.
   5. *Cross wind*—landing.

D. Night takeoff, landing.

Items on the list are checked off as accomplished. This flight practice guide can be used by the individual pilot in a fighter or T-6, as well as in planes with pilot and copilot.

Green Card Passengers?

DURING the past two years I have enjoyed the privilege of flying in USAF aircraft as pilot and sometimes as passenger over most of America.

I have observed closely the present flight briefings given to passengers by the commanders of aircraft and find that the range of briefing extends from occasionally complete disregard to thorough procedure briefing, including use of parachutes, emergency exits, use of safety belts and en route information.

Now the normal method of travel for Air Force personnel, and to an increasingly large extent for the other two services, is by air. I propose to outline a system whereby all Air Force personnel would be required to pass a small examination pertaining to their knowledge of parachutes, dinghy drill, use of oxygen and other relative subjects. Possibly, this could be extended to Navy and Army personnel. Such personnel who satisfy the examining authority that they are qualified to fly as passengers would be issued passenger cards, which would enhance their chances of obtaining airplane rides and give the pilots an idea of the knowledge possessed by passengers. If all passengers on a particular flight were in possession of these cards, he would know that an initial briefing would not be necessary, but that a normal flight briefing would be called for.

If this scheme were to be adopted, a higher degree of passenger proficiency would be attained and in the event of an emergency, confidence and ability to use equipment promptly and efficiently would be instrumental in reducing casualties.

Safety officers of each base could conduct the test for passenger cards and who knows, maybe in a few years there might be a need for higher ratings, perhaps even Green Cards for supersonic passengers!

FLIGHT LT. HENRY AMBROSE, RAF
On Exchange Duty, 78th Fighter Group
Hamilton Air Force Base, Calif.

VIOLENT WINDS

"THE Ice Cap and Arctic Weather," (*Flying Safety*, April, 1950) mentioned foehn winds in their role of modifying snow conditions. They do all sorts of other things, too.

At Narsarssuak (or BW-1, as it is more often called), an airbase in southwest Greenland, Mother Nature's sense of humor is displayed with monotonous regularity during the frequent occurrences of violent foehn winds.

By definition, foehns are warm, dry winds descending the leeward slope of mountain ranges. Though in the majority of cases, the word "descending" is hardly adequate—often, these winds *pour* down from the high expanse of the Greenland Ice Cap at 60 to 70 mph with gusts over 100, sometimes blowing for days and raising general havoc with everything in their path.

Fortunately, both the time and the intensity of these storms can usually be forecast. This prevents any large scale disasters, but no amount of warning or care can prevent the occasional freak incidents that have a note of humor associated with near tragedy.

In one instance, a parked and shackled C-46 was bravely bucking the storm only to have two jeeps and a 2½-ton truck blown into it, destroying a propeller and one of the tail surfaces and denting the bottom of the fuselage.

Few planes have been caught in the air during these storms, but one or two of the unfortunate pilots have interesting tales to tell. One training plane virtually had to power-dive to get back on the ground, and a C-46 pilot once reported severe turbulence in the vicinity, even as high as 11,000 feet. The most amazing incident occurred during a cross-fjord airflow when an incoming B-25 was caught in a violent downdraft followed by an equally violent updraft that ripped the depth charges from the belly of the plane, popped numerous rivets, and changed the dihedral of the wings over 10 degrees! The plane managed to limp back to the field but subsequently had to be scrapped.

What probably is the most erratic period in the history of temperature and wind recordings happened in a few hours' time. With all radical changes occurring in only a few minutes of these hours, the temperature went from —3°F. to 38° to 15° to 30° to 23° to 44°, for a net *increase* of 47° and a gross change of 107°! The total temperature increase that day was 53°, while the average diurnal variation for that time of year is 17°.

CAPT. W. L. ROBERTS, USAF, AWS.

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FLYING SAFETY

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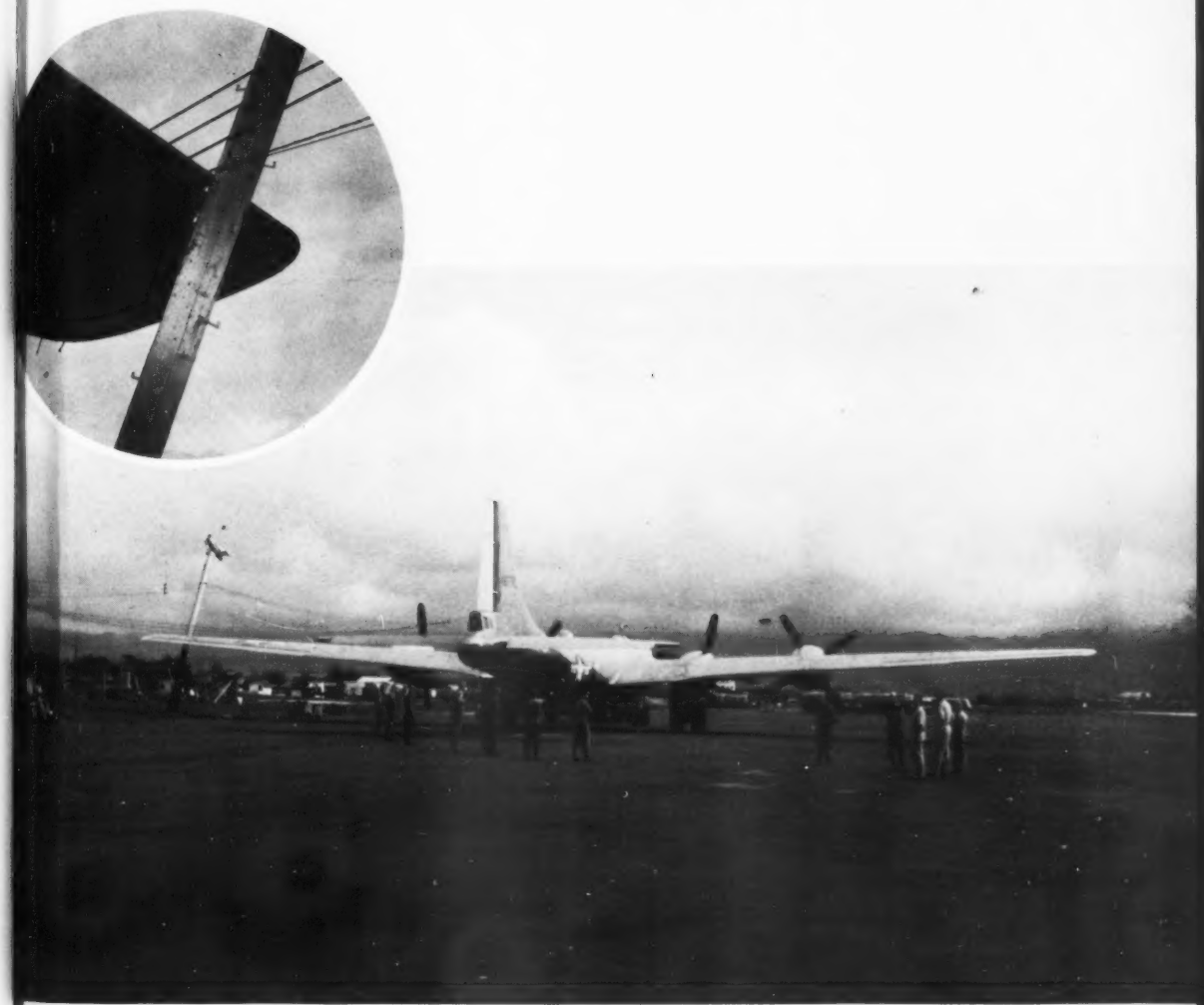
WHY?



GIVEN taxi clearance by the tower, the pilot of this B-29 started a right turn. The co-pilot was watching a follow-me vehicle out of the right side of the cockpit, but the man driving the vehicle was not directing the taxiing—at least, he gave no signals to the pilot. The pilot did not send a crew member out to check wingtip clearance during the turn out of the parking position, although there were 10 men aboard the bomber.

With neither pilot watching the left wingtip, the left wing collided with a pole. Visibility was 20 miles.

Mal Function

Mal invites a friend for flying,
Friend is not afraid of dying,

Shooting landing Mal is cocky;
Friend already feeling rocky.

Airspeed sinks in Mal's rendition,
Friend in section eight condition.

Reason for this growing doubt:—
Mal drags in from ten miles out.

Even though old Mal looks stronger,
Wiser friend will last much longer.

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